RCS

Model TXB16
X10 Thermostat

X10 Bidirectional Communications Protocol Manual

Revision 3.6

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TXB16 Thermostat with X10 Bidirectional Powerline Communications

The TXB16 X10 compatible thermostat uses standard X10 power line commands. Originally the X10 protocol was used for turning lights On and Off and dimming them. Each device is addressed as a House Code and a Unit Code. There are 16 possible House Codes (A-P) and 16 possible Unit codes (1-16). Each TXB16 is assigned a unique House Code and makes use of two types of X10 commands, the standard X10 House Code/Unit Code OFF and ON commands (such as "A1 ON") and Preset Dim Commands (such as "Unit 4 Preset level 18)

Unit Code commands have 32 possible commands (16 ON/16 OFF) plus Dim/Bright and All Lights On and All Units Off. The Preset Dim commands add another 32 commands for *each* Unit Code.

The TXB16 responds to X10 commands by decoding them into commands to change the thermostat setpoints and modes. The Unit Code On/Off commands are mapped into 32 thermostat commands that are referred to as "Decode Tables". Three Unit Code Decode Tables are defined for the TXB16, Table P, B and L. The Unit Code commands are ***receive only commands.***

The Preset Dim commands are decoded into a table with 512 **bi-directional** command/messages.

X10 Unit Code Decode Tables

Unit Code Decode tables use the simple direct X10 commands sent by devices like the X10 mini or maxi controller, most all home automation systems and many security systems. They consist of messages with House Code and Unit Code command sequences of "House Code/Unit Code/Command" such as "A1ON" (A= house code, 1 = unit code, On=command).

There are three Unit Code Command Decode Tables available in the TXB16, the P Decode table (default), the B Decode Table and the L Decode Table. Each has slightly different decode schemas.

- The P decode table is the primary and default table and is the same as used by the TX15-B thermostat.
- Non bi-directional TX15s used the B decode table.
- The L table is a special limited ON/OFF/SETBACK decode table for use with security systems that can have only one X10 House code and that must be shared with lighting and the thermostat.

Setting the Default Unit Code Decode Table.
The decode table is default set to P. You can change the decode table used by the TXB16 three ways.

1. For quick and easy setting the TXB16 to be compatibility with older TX15 software that used the "B" Decode Table, set the control unit dipswitch SW1 position 4 ON (**you must power cycle the control unit for this change to take affect**). In this position, the decode table selection cannot be overridden with any X10 commands (including preset dim commands).

2. Use the Unit Code All Lights On (ALO) or All Units Off (AUO) commands. ALO will set the unit code decode table to "B" and AUO will set the decode table to "P". These changes are stored in EEProm memory and will not be lost by a power cycle.

3. Use the Preset Dim commands to select the decode table.

    a. Unit code 4, preset level 29 will set the decode table to "P"
    b. Unit code 4, preset level 30 will set the decode table to "B"
    c. Unit code 4, preset level 31 will set the decode table to "L"

    These changes are also stored in EEProm memory and will not be lost by a power cycle.

Each Unit Code Decode table is included in the Decode Tables Section of this document. Refer to the tables for specific X10 command to TXB16 command decoding.

X10 Bi-Directional Preset Dim Decode Table

In order to allow a greater range of commands and to implement information feedback, RCS has implemented a bi-directional extension to it's X10 communications protocol by using the standard X10 Preset Dim command.

The X10 Preset Dim command format provides for 32 "levels" **within** each Unit Code. Thus, by sending a unique House Code, Unit Code and Preset Dim Level command, 512 commands become available for each House Code (16 Unit codes x 32 levels). The RCS X10 protocol maps these Preset Dim Levels into commands it uses for setpoint temperatures and modes and into data messages transmitted back to provide information from the thermostats such as current temperature, setpoint, and mode.

For a selected House Code, the RCS Bi-directional X10 protocol is structured, as follows, using the Preset Dim Levels of each Unit Code (see the Bi-Directional X10 Protocol Table on **page 8** for details of the individual Preset Level definitions):

Send A New Setpoint (4°- 127°)	Unit Codes 1, 2, 3, 9
Send Commands	Unit Code 4
Request Status	Unit Code 5
Report Status	Unit Code 6
Reserved	Unit Codes 7, 8
Echo Command Back	Unit Code 10
Report Temperature (-60° to +131°)	Unit Codes 11, 12, 13, 14, 15, 16

Setpoints may be interpreted by a thermostat/controller as either degrees Fahrenheit or Centigrade depending on the F/C mode on the thermostat. For Fahrenheit mode, the valid setpoints are 40 to 104 degrees. For Centigrade mode, the valid setpoints are 4 to 40 degrees. Any attempt, or command, to set the setpoint lower than 40°F/4°C will automatically be changed to 40°F/4°C.

Unit Code and Preset Dim Command Control

Both Unit Code and Preset Dim commands can be used simultaneously. Unit Code commands can be inhibited by a preset dim command (Unit 4 – level 18). Preset Dim commands can also be inhibited by a Preset Dim command (Unit 4 – level 20).

Note that the Preset Dim Command "Preset ON" (Unit 4 – level 19) command is always enabled to allow recovery in the event that BOTH Unit Code and Preset Dim commands were disabled.

Note: RCS uses preset levels numbered 1 to 32. Other systems may refer to these levels as 0 to 31.

Message Acknowledgment

In addition to the expanded command/message Preset Dim Command Table implemented with the RCS bi-directional X10 protocol, message acknowledgment capabilities were also added. Two different message acknowledgment methods are available and they are activated by Preset Dim Commands.

ACK MESSAGE When this message acknowledgment mode is activated, an RCS product that receives a valid X10 message will transmit an acknowledgment message in the form of the standard X10 "Status" message. For Unit Code and Preset Dim Commands. The ACK responses are as follows:

Status = ON, message received and command completed.
Status = OFF, message received but command not completed successfully.
No ACK back, message invalid or not received.

NOTE: No acknowledgment will be transmitted for Request Status Commands (Unit Code 5 Preset Levels). Since these commands themselves cause a return message to be transmitted, the returned data accomplishes the acknowledgment function.

The ACK MESSAGE format is enabled by Unit Code 4 "Send Command" group Preset Level 21 and disabled by Preset Level 22. The ACK mode is overridden by the ECHO mode.

COMMAND ECHO This message acknowledgment method echoes commands back. It uses the Preset Dim format and **only** works with the Preset Dim Commands in Unit Codes 1 to 4. When a Preset Level Command is received it is acknowledged by being echoed back as the **same preset level on a *different* unit code**. For instance, a Setpoint temperature transmitted as a Unit Code 1-3 Preset Level is echoed back in the corresponding temperature Preset Level in the REPORT TEMPERATURE Unit Codes 11-16. A Unit Code 4 Send Command Preset Level is echoed back as the same Preset Level in Unit Code 10.

The COMMAND ECHO format can be enabled and disabled by a Preset Level Command in the Unit Code 4 "Send Command" group.

SAFE MODE **This command has been disabled in version 3.6. The former function of SAFE mode is listed below for reference only.**

To insure that commands, which may have become garbled in transmission, do not cause erroneous actions, a Safe Command Mode is available. When activated, no command will be acted on unless it is ***received twice within a 2 second period***. Use of this mode, in conjunction with message acknowledgment, can insure fail-safe communications. This mode is enabled or disabled by a Preset Dim Command in the Unit 4 "Send Command" group.

X10 COMMAND MESSAGES

UNIT CODE MESSAGES

X10 messages sent as Unit codes 1 –16, On and Off are mapped to specific thermostat setpoints and modes. Unit codes can only send messages to the thermostat. Refer to the Unit Code Decode Tables P, B and L at the end of this document.

PRESET DIM MESSAGES

Each of the 16 Unit Codes has 32 Preset Dim levels (1-32). These are mapped to the following commands and status messages. The preset dim table allows the thermostat to have two way communications with the host system.

SEND SETPOINT COMMAND GROUP (Unit Codes 1, 2, 3, 9)

To send a new setpoint to a thermostat using the preset dim format, find the desired setpoint temperature in the temperatures mapped into Preset Levels in Unit Codes 1, 2 and 3, and send the appropriate Preset Dim Level command. The range is 4° to 99°. When a Unit Code 1, 2 or 3 Preset Level is received, the thermostat will update its setpoint to the new temperature per this decode table. Version 1.3 extended this group with the addition of Unit Code 9 for temperatures from 100° to 131° for pool/spa applications.

SEND COMMAND GROUP (Unit Code 4)

The RCS Bi-directional X10 Preset Dim Command format has 32 commands mapped as Preset Levels in Unit Code 4. These commands are described below.

SYSTEM MODE. These commands set the System Mode of the thermostat.

Unit Code 4:
- Preset Level 1 = SYSTEM OFF
- Preset Level 2 = HEAT MODE
- Preset Level 3 = COOL MODE
- Preset Level 4 = AUTO MODE

FAN MODE. These commands control the operation of the manual fan for the system.

Unit Code 4: Preset Level 5 = Fan ON
Preset Level 6 = Fan AUTO (= manual fan OFF)

SETBACK MODE. These commands cause the thermostat to go into and out of the setback mode. When the setback mode is turned on, the current setpoint will be changed to a new setback setpoint that is an offset from the current setpoint by a preset number of degrees called the ***setback delta***. The default setback delta is 8°F/4°C.

Unit Code 4: Preset Level 7 = SETBACK ON
Preset Level 8 = SETBACK OFF (Default)

When a SETBACK ON command is received and the thermostat is in the heating mode, the setpoint will be set back 8°F/4°C. In the cooling mode, the setpoint will be set up 8°F/4°C. In either case, the starting setpoint, at the time setback was received, is **saved**. When a SETBACK OFF command is received, the setpoint will be **restored** to the saved setpoint setting.

Example: Mode = Heat, Current Setpoint = 70°, Setback Delta = default of 8°
SETBACK ON command received: Setpoint is changed to 62° and old setpoint 70° is saved.
SETBACK OFF command received: Setpoint is changed back to saved setpoint of 70°.

NOTE: When a SETBACK ON command is received, the current setpoint is **stored** in a return setpoint register. When the SETBACK OFF command is received, it is the ***temperature in this register*** that is used to restore the setpoint; *no matter if the setpoint has been changed during the setback period, either manually or by another X10 command.*

INCREASE SETPOINT/DECREASE SETPOINT These commands will change the setpoint by 1°.

Unit Code 4: Preset Level 9 = Increase Setpoint 1°
Preset level 10 = Decrease Setpoint 1°

SETBACK DELTA SELECTION When a SETBACK ON command is received, the setpoint is changed by a Setback Delta (a preset number of degrees) that is added to **or** subtracted from the current setpoint, depending on what mode the unit is in. On power-up, the Setback Delta defaults to 8°F/4°C, but can be changed to any one of six alternate Setback Deltas using the following Preset Level Commands.

Unit Code 4: Preset Level 11 = 6°F/3°C
Preset Level 12 = 8°F/4°C (Default)
Preset Level 13 = 10°F/5°C
Preset Level 14 = 12°F/6°C
Preset Level 15 = 14°F/7°C
Preset Level 16 = 16°F/8°C

UNIT CODE ENABLE/DISABLE The response to Unit Code ON and OFF commands can be enabled or disabled by Preset Levels 17 and 18.

Unit Code 4: Preset Level 17 = UNIT ON (Default)
Preset Level 18 = UNIT OFF

PRESET COMMAND MODE ENABLE/DISABLE The response to the RCS Bi-directional Preset Dim Commands can be enabled or disabled by Preset Levels 19 and 20.

Unit Code 4: Preset Level 19 = PRESET ON (Default)
Preset Level 20 = PRESET OFF

ACK MESSAGE MODE ENABLE/DISABLE The message acknowledgment ACK MESSAGE mode can be enabled or disabled by Preset Levels 21 and 22. Responds with Status = ON.

Unit Code 4: Preset Level 21 = ACK ON
Preset Level 22 = ACK OFF (Default)

ECHO COMMAND MODE ENABLE/DISABLE The message acknowledgment ECHO COMMAND mode can be enabled or disabled by Preset Levels 23 and 24.

Unit Code 4: Preset Level 23 = ECHO ON
Preset Level 24 = ECHO OFF (Default)

SAFE COMMAND MODE ENABLE/DISABLE **SAFE COMMAND MODE HAS BEEN DELETED**

Unit Code 4 Preset Level 25 = SAFE ON
Preset Level 26 = SAFE OFF (Default)

AUTOSEND MODE ENABLE/DISABLE The AUTOSEND mode enables the controller to automatically send a message each time there is a change in temperature/setpoint/fan mode. A report of temperature change is preceded by a "Temp Change" Unit 6 level 9 report status message and a report of change in setpoint is preceded by a "Setpoint Change" Unit 6 level 10 report status message. The temperature or setpoint value is represented as a preset level in the Report Temperature group in Unit Codes 11-16. The AUTOSEND mode can be enabled or disabled by Preset Levels 27 and 28.

Unit Code 4: Preset Level 27 = AUTOSEND ON
Preset Level 28 = AUTOSEND OFF (Default)

UNIT CODE DECODE TABLE SELECTION The RCS Bi-directional X10 format allows for up to four alternate Unit Code Decode Tables. The default Decode Table is Table P. The active table can be changed to one of the alternate tables with a Preset Dim Level Command.

Preset Dim Command:

Unit Code 4: Preset Level 29 = Decode Table P (Default)
Preset Level 30 = Decode Table B
Preset Level 31 = Decode Table L
Preset Level 32 = Not used

Unit Code Command: You can switch between Decode Table P and Table B, by sending the **All Lights On** command to select Table B or by sending the **All Units Off** command to select Table P.

Control Unit Dipswitch. The Decode Table can also be changed by the dipswitch on the Control Unit. Setting Dipswitch position 4 to ON will forced the decode table to "B" and overrides all other commands.

NOTE: All changes in the setup made by the Unit 4 "Send Command" commands are permanently stored in EEProm memory. These changes will not be lost or reset by a power cycle.

REQUEST STATUS COMMAND GROUP (Unit Code 5)

The RCS bi-directional X10 protocol implements bi-directional information requests using Preset Dim levels for both the Request Status Commands and the Report Status responses.. The Request Status commands include "Temperature", "Setpoint", "Mode", "Fan Mode", "Setback Mode", and "Setback Delta". When these Request Status commands are received they will cause a response message to be sent back

TEMPERATURE The request for status TEMPERATURE command causes the current temperature to be sent back as the corresponding Preset Level in the Report Temperature Unit Codes 11,12,13,14,15,or 16. The temperature range defined is -60° to 131°F or °C (not all thermostats or sensors are capable of measuring this range).

Unit Code 5: Preset Level 1 Request Status TEMP

SETPOINT The request for status SETPOINT (SP) command is similar to the request for status TEMPERATURE command in that it causes the current Setpoint temperature to be sent back as the corresponding Preset Level in the Report Temperature Unit Codes 11 to 16. The temperature range for setpoints is limited to a range of 44°F to 110°F for Cooling and 40°F to 106°F for Heating. The setpoint returned will be for the current operating mode, Heating or Cooling. If dual setpoints are enabled, either a SPH for heating or a SPC for cooling will be returned.

Unit Code 5: Preset Level 2 Request Status SETPOINT

MODE The request for status MODE command causes the current system MODE of the thermostat (OFF, HEAT, COOL, AUTO) to be sent as a Preset Level (1, 2, 3, or 4) in Report Status Unit Code 6.

Unit Code 5: Preset Level 3 Request Status MODE

FAN MODE The request for status FAN mode command causes the current FAN mode (ON/OFF) to be sent back as a Preset Level (5 or 6) in Report Status Unit Code 6.

Unit Code 5: Preset Level 4 Request Status FAN MODE

SETBACK MODE The request for status of the Setback mode command causes the current Setback status (ON/OFF) to be sent back as a Preset Level (7 or 8) in Report Status Unit Code 6.

Unit Code 5: Preset Level 5 Request Status SETBACK MODE

SETBACK DELTA The request for status of the Setback Delta command causes the current Setback Delta offset (in degrees) to be sent back as the corresponding Preset Level in the Report Temperature Unit Codes 11,12,13,14,15, or 16.

Unit Code 5: Preset Level 6 Request Status SETBACK DELTA

OT (Reserved) This Preset Level is reserved for requesting Outside Temperature. (Not supported this version)

Unit Code 5: Preset Level 7 Request Status OUTSIDE TEMPERATURE

HEAT SETPOINT The request for status HEAT SETPOINT (SPH) command is similar to the request for status SETPOINT command in that it causes the current HEAT Setpoint temperature to be sent back as the corresponding Preset Level in the Report Temperature Unit Codes 11 to 16. The temperature range available is the same, however, setpoints are limited to a range of 40°F/5°C to 99°F/99°C.

Unit Code 5: Preset Level 8 Request Status HEAT SETPOINT

COOL SETPOINT The request for status COOL SETPOINT (SPC) command is similar to the request for status SETPOINT command in that it causes the current COOL Setpoint temperature to be sent back as the corresponding Preset Level in the Report Temperature Unit Codes 11 to 16. The temperature range available is the same, however, setpoints are limited to a range of 40°F/5°C to 99°F/99°C.

Unit Code 5: Preset Level 9 Request Status COOL SETPOINT

PRESET LEVELS 10 to 25 are reserved for future use.

COMMUNICATIONS MODES. The request for status of the X10 communications mode command causes the current state of the various X10 communications modes to be sent back as Preset Levels on Unit Code 6. The Report Status preset levels match the corresponding Send Command preset levels for the following modes: Unit Codes, Preset Codes, Acknowledge mode, Echo mode, Safe mode, Autosend Mode, Decode table, and Test mode. Note: Test Mode only reports when it is enabled, no response is sent if it is off.

Unit Code 5: Preset Level 26 Request Status COMMUNICATIONS MODES

DUAL SETPOINT MODE The TXB16 thermostat has dual setpoints internally. It can report as a single setpoint to be compatible with older TX15 software or report separate heating/cooling setpoints. This command enables dual setpoint reporting.

Unit Code 5: Preset Level 29 Set DUAL SETPOINT MODE ON (default)
Preset Level 30 Set DUAL SETPOINT MODE OFF

NOTE: Preset level 29 MUST BE ON for AUTOSEND mode to report status of SPH and SPC.

TEST MODE Turns the test mode ON or Off. Sets the Minimum Run Time and Minimum Off Time delays to 20 seconds. For use in system testing.

Unit Code 5: Preset Level 31 Set TEST MODE ON
Unit Code 5: Preset Level 32 Set TEST MODE OFF (default)

CAUTION: Do not put an operational (live) HVAC system into test mode as all safety delays will be shortened. Disconnect the thermostat HVAC outputs when TEST mode is used.

REPORT STATUS GROUP (Unit Code 6)

In response to Request Status commands in Unit Code 5, Report Status message are transmitted to report the current status of the requested MODE. The format for the Report Status message is as follows:

Unit Code 6	Preset Level 1	Report Status	System Mode = OFF
	Preset Level 2	Report Status	System Mode = HEAT
	Preset Level 3	Report Status	System Mode = COOL
	Preset Level 4	Report Status	System Mode = AUTO
	Preset Level 5	Report Status	Fan Mode = ON
	Preset Level 6	Report Status	Fan Mode = Off (AUTO)
	Preset Level 7	Report Status	Setback Mode = ON
	Preset Level 8	Report Status	Setback Mode = OFF
	Preset Level 9	Report Status	Temp Change*
	Preset Level 10	Report Status	Setpoint Change*
	Preset Level 11	Report Status	Reserved for Outside Temp
	Preset Level 12	Report Status	Heat Setpoint Change* (Precedes a Report Temp preset level when Autosend is ON AND Dual SP mode is ON) (Ver 1.4)
	Preset Level 13	Report Status	Cool Setpoint Change* (Precedes a Report Temp preset level when Autosend is ON AND Dual SP mode is ON (Ver 1.4)
	Preset Level 17	Report Status	Unit Code Commands ENABLED
	Preset Level 18	Report Status	Unit Code Commands DISABLED
	Preset Level 19	Report Status	Preset Dim Commands ENABLED
	Preset Level 20	Report Status	Preset Dim Commands DISABLED
	Preset Level 21	Report Status	Acknowledgement Message ENABLED
	Preset Level 22	Report Status	Acknowledgement Message DISABLED
	Preset Level 23	Report Status	Echo Command ENABLED
	Preset Level 24	Report Status	Echo Command DISABLED
	Preset Level 25	Report Status	Safe Mode ENABLE (deleted in Ver 3.6)
	Preset Level 26	Report Status	Safe Mode DISABLE
	Preset Level 27	Report Status	Autosend Mode ENABLED
	Preset Level 28	Report Status	Autosend Mode DISABLED
	Preset Level 29	Report Status	Decode Table P SELECTED
	Preset Level 30	Report Status	Decode Table B SELECTED
	Preset Level 31	Report Status	Decode Table L SELECTED
	Preset Level 32	Report Status	Test Mode ENABLED

* These responses precede a Report Temp preset level when Autosend is On

RESERVED UNIT CODE GROUP (Unit Codes 7, 8)

Unit Codes 7 and 8 are reserved for future use.

SEND SETPOINT (Unit Code 9)

Extension of Send Setpoint Unit Code group 1, 2, 3. Adds temperatures from 100° to 131°.

ECHO COMMAND (Unit Code 10)

Echoes the preset level of a Unit Code 4 Command on Unit Code 10 if ECHO mode is On. For secure communications and message acknowledgment. **ECHO mode overrides the ACK mode.**

REPORT TEMPERATURE GROUP (Unit Codes 11, 12, 13, 14, 15, 16)

In response to receiving a Unit Code 5, Preset Level 1 Request for Temperature Command **or** Preset Level 2 Request for Setpoint Command, a Preset Level reply will be sent back, which corresponds to the temperature map in the Report Temperature Unit Codes 11 - 16.

RESTORE DEFAULTS COMMAND

The TXB16 with firmware version 3.5.0 or later has a RESTORE DEFAULTS command sequence to reset all the Preset Dim communication modes to their default settings. It also restores the thermostat X10 address to A and the Unit Code Table to P. In order to execute the restore defaults command, you must send a specific sequence of four House Code/Unit Code ON/OFF commands. Upon successful receipt of the command sequence the status LED will flash a long flash followed by 4 short flashes. (rev 3.0)

Restore Defaults Command Sequence: P4-ON, L3-OFF, H2-ON, D1-OFF

CAUTION! All thermostats on the X10 powerline network will be reset by this command. Disconnect the PLI module on any stats you do not want to be reset. Note that the X10 address will be reset to A.

Table Revision 3.6 Firmware 3.6.0 or later versions

RCS BI-DIRECTIONAL X10 PROTOCOL - PRESET DIM COMMAND TABLE

		Send Setpoint (SP)			Send Command	Request Status	Report Status	Not Used		Send SP**	Echo ***	REPORT TEMPERATURE					
DIM Level	Preset Level	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16
0%	1	4°	36°	68°	SYSTEM OFF	TEMP	OFF			100°	Echo	-60°	-28°	4°	36°	68°	100°
3%	2	5°	37°	69°	HEAT MODE	SETPOINT	HEAT			101°	Echo	-59°	-27°	5°	37°	69°	101°
6%	3	6°	38°	70°	COOL MODE	MODE	COOL			102°	Echo	-58°	-26°	6°	38°	70°	102°
10%	4	7°	39°	71°	AUTO MODE	FAN	AUTO			103°	Echo	-57°	-25°	7°	39°	71°	103°
13%	5	8°	40°	72°	FAN ON	SB MODE	FAN ON			104°	Echo	-56°	-24°	8°	40°	72°	104°
16%	6	9°	41°	73°	FAN AUTO	SB DELTA	FAN AUTO			105°	Echo	-55°	-23°	9°	41°	73°	105°
19%	7	10°	42°	74°	SETBACK ON	(Resv OT)	SB ON			106°	Echo	-54°	-22°	10°	42°	74°	106°
23%	8	11°	43°	75°	SETBACK OFF	HEAT SP	SB OFF			107°	Echo	-53°	-21°	11°	43°	75°	107°
26%	9	12°	44°	76°	INCREASE 1 DEG	COOL SP	TEMP CHG*			108°	Echo	-52°	-20°	12°	44°	76°	108°
29%	10	13°	45°	77°	DECREASE 1 DEG		SETPT CHG*			109°	Echo	-51°	-19°	13°	45°	77°	109°
32%	11	14°	46°	78°	SB DELTA 6°F/3°C		(Resv OT)			110°	Echo	-50°	-18°	14°	46°	78°	110°
35%	12	15°	47°	79°	SB DELTA 8°F/4°C		SP HT CHG*			111°	Echo	-49°	-17°	15°	47°	79°	111°
39%	13	16°	48°	80°	SB DLTA 10°F/5°C		SP CL CHG*			112°	Echo	-48°	-16°	16°	48°	80°	112°
42%	14	17°	49°	81°	SB DLTA 12°F/6°C					113°	Echo	-47°	-15°	17°	49°	81°	113°
45%	15	18°	50°	82°	SB DLTA 14°F/7°C					114°	Echo	-46°	-14°	18°	50°	82°	114°
48%	16	19°	51°	83°	SB DLTA 16°F/8°C					115°	Echo	-45°	-13°	19°	51°	83°	115°
52%	17	20°	52°	84°	UNIT ON		UNIT ON			116°	Echo	-44°	-12°	20°	52°	84°	116°
55%	18	21°	53°	85°	UNIT OFF		UNIT OFF			117°	Echo	-43°	-11°	21°	53°	85°	117°
58%	19	22°	54°	86°	PRESET ON		PRESET ON			118°	Echo	-42°	-10°	22°	54°	86°	118°
61%	20	23°	55°	87°	PRESET OFF		PRESET OFF			119°	Echo	-41°	-9°	23°	55°	87°	119°
65%	21	24°	56°	88°	ACK ON		ACK ON			120°	Echo	-40°	-8°	24°	56°	88°	120°
68%	22	25°	57°	89°	ACK OFF		ACK OFF			121°	Echo	-39°	-7°	25°	57°	89°	121°
71%	23	26°	58°	90°	ECHO ON		ECHO ON			122°	Echo	-38°	-6°	26°	58°	90°	122°
74%	24	27°	59°	91°	ECHO OFF		ECHO OFF			123°	Echo	-37°	-5°	27°	59°	91°	123°
77%	25	28°	60°	92°	SAFE ON ****		SAFE ON			124°	Echo	-36°	-4°	28°	60°	92°	124°
81%	26	29°	61°	93°	SAFE OFF ****	COM MODES	SAFE OFF			125°	Echo	-35°	-3°	29°	61°	93°	125°
84%	27	30°	62°	94°	AUTOSEND ON		AUTO ON			126°	Echo	-34°	-2°	30°	62°	94°	126°
87%	28	31°	63°	95°	AUTOSEND OFF		AUTO OFF			127°	Echo	-33°	-1°	31°	63°	95°	127°
90%	29	32°	64°	96°	DECODE TABLE P	Dual SP On	TABLE P			NA	Echo	-32°	0°	32°	64°	96°	128°
94%	30	33°	65°	97°	DECODE TABLE B	Dual SP Off	TABLE B			NA	Echo	-31°	1°	33°	65°	97°	129°
97%	31	34°	66°	98°	DECODE TABLE L	Test On	TABLE L			NA	Echo	-30°	2°	34°	66°	98°	130°
100%	32	35°	67°	99°	Not used	Test Off	TEST ON			NA	Echo	-29°	3°	35°	67°	99°	131°

Note 1. * These Report Status messages are followed by a Report Temp message when Autosend is On. Dual SP must be ON for SPH and SPC to be reported.
Note 2. ** This Unit Code is a continuation of Send Setpoint Unit Codes 1, 2 , 3.
Note 3. *** A Unit Code 4 command's preset level is echoed back as a Unit Code 10 preset level when Echo is On.
Note 4. **** SAFE MODE HAS BEEN PERMANENTLY DISABLED.

= Default modes of operation

X10 THERMOSTAT UNIT CODE COMMANDS
DECODE TABLE P

Version P 1.6

UNIT CODE	ON Command	OFF Command
	°F / °C	°F / °C
1	65° / 13°	73° / 21°
2	66° / 14°	74° / 22°
3	67° / 15°	75° / 23°
4	68° / 16°	76° / 24°
5	69° / 17°	77° / 25°
6	70° / 18°	78° / 26°
7	71° / 19°	79° / 27°
8	72° / 20°	80° / 28°
9	HEAT ON	SYS OFF
10	COOL ON	SYS OFF
11	AUTO ON	SYS OFF
12	FAN ON	FAN OFF
13	SETBACK ON H: Current SP - 8°F/4°C C: Current SP+ 8°F/4°C	SETBACK OFF Return to original SP before ON command.
14	SB = 6°F/3°C	SB = 12°F/6°C
15	SB = 8°F/4°C	SB = 14°F/7°C
16	SB = 10°F/5°C	SB = 16°F/8°C

Unit codes 1-8 set a specific temperature setpoint in the thermostat. °F or °C operation is set by dipswitch/ jumper options in the thermostat units.

Unit codes 9-12 control the Mode of the thermostat. Each unit code ON mode has a corresponding OFF mode.

Unit code 13 ON is a SETBACK ON command that causes the setpoint to change by an offset (delta) from the current setpoint. The default offset value is 8°F(4°C). In the Heating mode, the setpoint will decrease 8°F(4°C). In the Cooling mode, the setpoint will increase 8°F(4°C). Only one SETBACK ON command will be acted on, subsequent SETBACK ON commands will be ignored until a SETBACK OFF command is received (for instance, you cannot setback 16° by sending two consecutive SETBACK ON commands).

Unit code 13 OFF is a SETBACK OFF command that causes the setpoint to return to the original setpoint *before the setback occurred.*

Unit codes 14, 15 and 16 are optional setback offset (deltas) values. When selected, they replace the default setback offset of 8°F/4°C.

Bright and Dim commands. The "Bright" command will increment the current setpoint by 1°. The "Dim" command will decrement the current setpoint by 1°. Holding down a Bright or Dim button on an X10 controller will cause the setpoint to ramp up or down until released.

Unit Code Table Select. You can change the Unit Code Decode Table selected by sending an **"All Lights On"** command to select Decode Table B or by sending an **"All Units OFF"** command to select Decode Table P.

Note: If the Control Unit Dipswitch position 4 is ON to force the "B" decode table, the All Lights On and All Units Off commands are ignored.

X10 THERMOSTAT UNIT CODE COMMANDS
DECODE TABLE B

Version B 1.5

UNIT CODE	ON Command	OFF Command
	°F / °C	°F / °C
1	72° / 17°	SYSTEM OFF
2	73° / 18°	HEAT MODE
3	74° / 19°	COOL MODE
4	75° / 20°	AUTO MODE
5	76° / 21°	45° / 5°
6	77° / 22°	60° / 6°
7	78° / 23°	62° / 7°
8	79° / 24°	63° / 8°
9	80° / 25°	64° / 9°
10	81° / 26°	65° / 10°
11	82° / 27°	66° / 11°
12	83° / 28°	67° / 12°
13	84° / 29°	68° / 13°
14	86° / 30°	69° / 14°
15	88° / 31°	70° / 15°
16	90° / 32°	71° / 16°

Unit codes 1-16 For the House code address set in the controller, each unit code sent will set a specific temperature setpoint or mode in the thermostat according to the table above. °F or °C operation is set by the setup mode on the Wall Display Unit.

Bright and Dim commands. The "Bright" command will increment the current setpoint by 1°. The "Dim" command will decrement the current setpoint by 1°. Holding down a Bright or Dim button on an X10 controller will cause the setpoint to ramp up or down until released.

Unit Code Table Select. You can change the Unit Code Decode Table selected by sending an **"All Lights On"** command to select Decode Table B or by sending an **"All Units OFF"** command to select Decode Table P.

Note: If the Control Unit Dipswitch position 4 is set to "ON" to force the "B" decode table, the All Lights On and All Units Off commands will be ignored. (The control unit must be power cycled for the switch change to take affect).

RCS

DECODE TABLE L

X10 THERMOSTAT UNIT CODE COMMAND TABLE

Version L 1.0

UNIT CODE	ON Command	OFF Command
1	NA	NA
2	NA	NA
3	NA	NA
4	NA	NA
5	NA	NA
6	NA	NA
7	System On	System Off
8	Setback On	Setback Off
9	NA	NA
10	NA	NA
11	NA	NA
12	NA	NA
13	NA	NA
14	NA	NA
15	NA	NA
16	NA	NA

NA = No action to an X10 unit code command.

UNIT CODE "7 OFF": Thermostat OFF. This command will turn the thermostat system to the off mode. The mode the thermostat was set to at the time of the off command is stored in memory. Local mode control at the Wall Display Unit is still active and can be used to override the off command and set the thermostat to a new mode. (Caution: the X10 *command state* may still show the last X10 command was the Off command, but local control may have changed modes.)

UNIT CODE "7 ON": Thermostat ON. This command will turn the thermostat system on and restore the thermostat to the mode it was in at the time of the *last* off command (either local off or X10 off command).

UNIT CODE "8 ON" : SETBACK ON. This command will change the setpoint by an setback (or setup) offset (delta) from the current setpoint. The offset delta value is 8°F(4°C). In the Heating mode, the setpoint will decrease 8°F(4°C). In the Cooling mode, the setpoint will increase 8°F(4°C). Only one SETBACK ON command will be acted on, subsequent SETBACK ON commands will be ignored until a SETBACK OFF command is received (for instance, you cannot setback 16° by sending two consecutive SETBACK ON commands).

UNIT CODE "8 OFF": SETBACK OFF. This command will change the setpoint back to the original setpoint before the SETBACK ON command occurred.